CONTENTS

JANUARY, 1935

Instantaneous Speeds in Air of Explosion Reports at Short Distances from the Source . . . F. L. PARTLO AND JERRY H. SERVICE 1
Shot Effect and Thermal Agitation in an Electron Current Limited by Space Charge . . . G. L. PEARSON 6
Potential Distribution Between Parallel Plates and Concentric Cylinders Due to Any Arbitrary Distribution of Space Charge . . . W. G. CADY 10
Potential Distributions About an Infinitely Extended Line Electrode on the Surface of a Horizontally Stratified Earth. II . . . MORRIS MUSKAT 14
Note on Mixed Boundary Value Problems in Logarithmic Potential Theory MORRIS MUSKAT 27
On Electric Charges of Disperse Systems Which Are the Seats of Physico-Chemical Reactions . . . N. RASHEVSKY 33
Mechanism of Division of Small Liquid Systems Which Are the Seats of Physico-Chemical Reactions. II. Instability of Two-Phase Systems . . . N. RASHEVSKY 35
Flexure Problem for Rectangular Beams with Slits . . . DWIGHT F. GUNDER 38
Determination of the Refractive Index of Vitreous Silica and the Calibration of Silica Refraction Thermometers Between 18° and −200°C . . . J. B. AUSTIN AND R. H. H. PIERCE, JR. 43
Magnetic Susceptibility of Some Alloys of "Gamma-Brass" Structure . CYRIL STANLEY SMITH 47

FEBRUARY, 1935—RHEOLOGY NUMBER

Method for Measuring the Pressure in a Rubber Extruding Machine . . . J. H. DILLON AND P. M. TORRANCE 53
Rheological Properties of Asphalt. II. Discussion of Penetration-Viscosity Relationships . . . R. N. TRAXLER, C. U. PITTMAN AND F. B. BURNS 58
Ostwald Viscometers for Petroleum Oils . . . EUGENE WILLIHNGANZ 61
Association by the Fluidity Method of Substances Which Are Solid at Ordinary Temperatures . . . EUGENE C. BINGHAM AND JAMES E. HATFIELD 64
Some Viscosity Data for Boron Trioxide . . . GEORGE S. PARKS AND MONROE E. SPAGHT 69
Viscosity of Mixtures of Liquids at High Pressures . . . R. B. DOW 71
Errata: Flow Characteristics of Sewage Sludge and Other Thick Materials . . . WILHELM MERKEL 80

MARCH, 1935

Multiple Space Charge Effect . . . EVERETT W. THATCHER 81
Some Electrical Properties of Ceresin Wax . . . A. WIKSTROM 86
Optical Method for Measuring the Distribution of Velocity Gradients in a Two-Dimensional Flow . . . E. D. ALCOCK AND C. L. SADRON 92
Magnetic Properties and Orientation of Ferromagnetic Particles . . . C. W. DAVIS 96
Comparison of the Temperatures in a Solid and Its Scaled Model . . . R. V. CHURCHILL 100
Magnetic Anisotropy in Silicon Steel . . . K. J. SIXTUS 105
Growth of Crystals of Zinc Containing Cadmium by the Czochralski-Gomperz Method . . . HAROLD K. SCHILLING 111
Mathematical Physics of Metabolizing Systems with Reference to Living Cells . . . N. RASHEVSKY 117

APRIL, 1935

Telegraphist's Equations at Ultra-High Frequencies . . . RONOLD KING 121
Mechanism of the High Velocity of Propagation of Lightning Discharges . . . A. M. CRAVATH AND L. B. LOEB 125
Coercive Force of Magnetite Powders . . . V. H. GOTTSCHALK 127
Propagation of Rayleigh Waves in Heterogeneous Media . . . CHAIM L. PEKERIS 133
Note on a Problem in Conduction . . . L. B. SNODDY 139
Internal Dissipation in Solids for Small Cyclic Strains . . . R. L. WEGEL AND H. WALTHER 141
Erratum: Electrical Conductivity of Glass . . . H. R. KIEHL 158

MAY, 1935—RHEOLOGY NUMBER

Effects of Acids and Alkalies on the Viscous and Structural Properties of Protoplasm . . . . . WILLIAM SEIFRIZ 159
New Feature in the Calibration of a Capillary-Tube Viscometer . . . . . LAURENCE W. SPOONER AND PAUL SEREX 162
V. Correlation of Distillation Range with the Viscosity of Creosote . . . . C. J. FROSCH 165
VI. Correlation of the Distillation Range with the Surface Tension of Creosote C. J. FROSCH 171
VII. Correlation of Distillation Range with the Interfacial Tension of Creosote Against Water . . . . . C. J. FROSCH 174
Errata: Theory of Non-Newtonian Liquids . . . . . MARKUS REINER 177
Errata: Viscometric Studies of Rubber Solutions . . . . . MARKUS REINER 177
Letter to the Editor:
Propagation of Rayleigh Waves in Heterogeneous Media—an Addition . . . CHAIM L. PEKERIS 178

JUNE, 1935

Theory of Photoelasticity in Amorphous Solids . . . . . HANS MUELLER 179
Some Observations on the Movement and Demagnetization of Ferromagnetic Particles in Alternating Magnetic Fields . . . . . C. W. DAVIS 184
Determination of Arc Temperature from Sound Velocity Measurements. I . . . . . CHAUNCEY GUY SUITS 190
Determination of Arc Temperature from Sound Velocity Measurements. II . . . . . HILLEL PORITSKY AND CHAUNCEY GUY SUITS 196
Temperature Variation of the Photoelectric Emission from Thorium Oxide . . . . . J. H. MARCHANT, JR. 202
Grating Theory and Study of the Magnetostatic Oscillator Frequency . . CLAUD E. CLEETON 207

JULY, 1935

Floating Grid Direct-Current Amplifier . . . P. A. MACDONALD AND E. M. CAMPBELL 211
Magnetic Hysteresis at Low Flux Densities . . . . . W. B. ELLWOOD 215
High Frequency Conductance of Pyrex Glass in the Presence of Vapors . . W. M. ROBERDS 227
Theory of Two-Dimensional Longitudinal and Flexural Vibrations in Rectangular Isotropic Plates . . . . . HAROLD OSTERBERG AND JOHN W. COOKSON 234
Longitudinal, Shear and Transverse Modes of Vibration in Quartz and Tourmaline . . . . . HAROLD OSTERBERG AND JOHN W. COOKSON 246
Erratum: Flexure Problem for Rectangular Beams with Slits . . . DWIGHT F. GUNDER 256

AUGUST, 1935—RHEOLOGY NUMBER

Influence of an Electric Field on the Viscosity of Aeolotropic Liquids . . YNGVE BJÖRNSTÅHL 257
Motion of a Viscous Fluid Under a Surface Load . . . . . N. A. HASKELL 265
Note on Viscosity as a Function of Volume and Temperature of Oils . . . . R. B. DOW 270
Velocity-Gradient Methods in Rheology . . . . . E. G. RICHARDSON 273

SEPTEMBER, 1935

Heat Treatment of Magnetic Materials in a Magnetic Field. I. Survey of Iron-Cobalt-Nickel Alloys . . . . . JOY F. DILLINGER AND RICHARD M. BOZORTH 279
Heat Treatment of Magnetic Materials in a Magnetic Field. II. Experiments with Two Alloys . . . . . RICHARD M. BOZORTH AND JOY F. DILLINGER 285
General Solution for the Displacements of Piezoelectric Media Which Are Subjected to Constant Electric Fields . . . . . ARNOLD D. HESTENES AND HAROLD OSTERBERG 291
On Anchoring the Mercury Pool Cathode Spot . . . . . LEWI TONKS 294
Operating Characteristics of the FP54 Thermionic Direct-Current Amplifying Tube . . . . . P. A. MACDONALD AND W. E. TURNBULL 304
Some Physico-Mathematical Aspects of Nerve Conduction. II . . . . . N. RASHEVSKY 308

OCTOBER, 1935

Study of Arc Temperatures by an Optical Method . . . . . C. G. SUITS 315
Shot Effects of Secondary Electron Currents . . . . . LUCY J. HAYNER 323
Effect of Changes in the Equilibrium Relative Vapor Pressure Upon the Capillary Structure of Wood . . . . . ALFRED J. STAMM 334
Further Studies on Mathematical Physics of Metabolizing Systems with Reference to Living Cells . . . . . N. RASHEVSKY 343

NOVEMBER, 1935—RHEOLOGY NUMBER

Flow Through Submerged Orifices . . . . . JAKOB KUNZ 351
Viscous Properties of Polyisobutylene . . . . . JOHN D. FERRY AND GEORGE S. PARKS 356
Compressional Waves in Media with Complex Viscosity . . . . . A. GEMANT 363

DECEMBER, 1935

Effect of Certain Discontinuities on the Pressure Distribution in a Loaded Soil . M. A. BIOT 367
Magnetic Properties and Orientation of Ferromagnetic Particles. II. Pyrrhotite C. W. DAVIS 376
Space Charge in Liquid Dielectrics . . . . . J. B. WHITEHEAD AND E. E. MINOR 380
Dynamical Similarity Laws of the Mercury High Pressure Discharge . . . G. HELLER 389
Electrical Conduction Models for the Solution of Water Seepage Problems . . . . . R. D. WYCKOFF AND D. W. REED 395
Seepage of Water Through Dams with Vertical Faces . . . . . MORRIS MUSKAT 402
Dielectric Properties of Anodic Layers in Aluminum Electrolytic Condensers . . . . . J. E. LILIENFELD, L. CHANDLER, JR. AND S. GOLDMAN 416
Author Index to Volume 6 426
Analytic Subject Index to Volume 6 428